# 3.6 Market failure and intervention

Name: _____ Class: _____ Date: _____ **Total: 20 marks**

**KEY WORDS** externality • marginal social cost • incidence

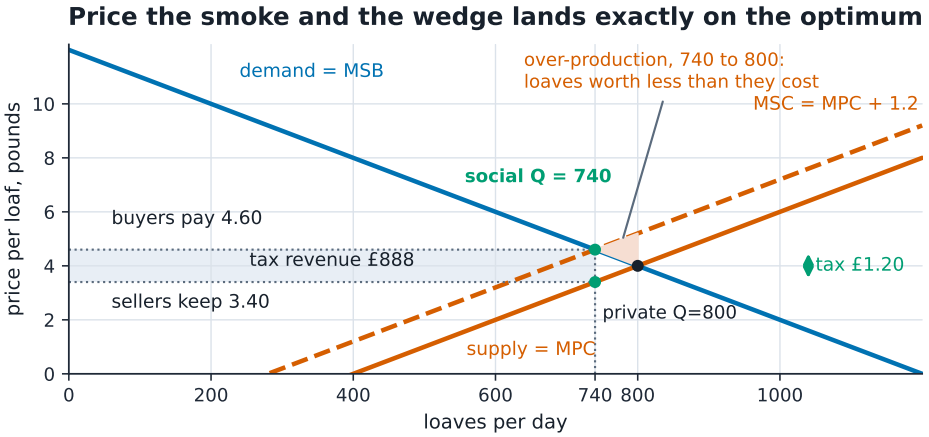
## Objective

Compute a market's private equilibrium and its social optimum under an external cost; size the Pigouvian tax and its wedge; separate the revenue rectangle from the welfare triangle; classify failures; state the limits honestly.

## 1 Key knowledge and worked examples

### ■ Costs that miss the bill

An **externality** puts a cost on outsiders, so the private curves miss it: **marginal social cost** = private cost + external cost. The optimum sets MSB = MSC; a tax equal to the external cost makes the private arithmetic tell the social truth, and elasticities – not paperwork – divide the burden (**incidence**).




*Price the smoke and the wedge lands exactly on the optimum*

### ■ Worked example. The mill's £1.20

Private: 800 loaves at £4. With the £1.20 damage priced, buyers face $P_c$ and sellers keep $P_c - 1.2$: $1200 - 100P_c = 400 + 100(P_c - 1.2)$ gives £4.60 / £3.40 and Q = 740 ✓ – the MSB = MSC quantity, wedge split £0.60/£0.60 ✓, revenue $740 \times 1.2 =$ £888 ✓, pure gain the small triangle ≈ £36 a day ✓.

## 2 Practice

The brewery downstream empties warm water into the canal; each crate of beer carries £1.00 of unpriced damage. The private market has $Q_d = 800 - 100P$ and $Q_s = 100P$ (P in £ per crate).

**2.1** Compute the private equilibrium. Then compute the social optimum: the price buyers pay, the price sellers keep, and the quantity. [5]

**2.2** Check crate 390 explicitly: the buyer's value, the seller's private cost, and the full social cost. Should it be brewed? [3]

**2.3** For the £1 tax at the optimum: compute the tax revenue, and explain in one line each why the revenue is a transfer but the triangle is a gain. [4]

**2.4** Classify each situation: (a) the canal damage above; (b) the towpath's new street lighting; (c) a stall selling day-old pastries as fresh; (d) beer prices rising because barley is dearer this year. [4]

**2.5** The council levies £1 per crate as ordinary revenue and leaves the brewery's outfall unpriced; separately, an engineer values the true damage at £1.40, not £1.00. In two lines each: what does each error do? [4]

exercises.lol exercises.com.cn